Overview:

• About Facilities Management

• Issues affecting the use of building information for managing historic buildings

• Building Information Modelling (BIM) for Historic Buildings

• Issues to consider in relation to Digital Information and BIM for managing historic buildings
• Relatively new discipline
• Still being defined
• International FM Association definition:

A profession that encompasses multiple disciplines to ensure functionality of the built environment by integrating people, place, processes and technology.

Term “facilities manager” is new, but the role has been around for a long time:
It's the responsibility of facilities managers to make sure that a building and its services fulfil the needs of the organisation using it. Once construction is completed, facilities managers are employed to take care of all the different issues required to make a building work. This allows people using the property to continue living and working in it.

In depth

Their work involves:

- planning how the inside of a building should be organised
- taking charge of renovations and office moves
- maintaining buildings and ensuring everything is in good working order
- ensuring all IT systems function effectively (e.g., phones, computers, faxes, photocopiers)
- managing a building's security
- organising the cleaning and general upkeep of a building
- negotiating the best possible deals for all of the above.
Analysis of client requirements  
Conflict avoidance, management and dispute resolution procedures  
Construction technology and environmental services  
Consultancy services  
Contract administration  
Contract practice  
Corporate real estate management  
Design and specification  
Environmental management  
Fire safety  
GIS  
Health and safety  
Landlord and tenant (including rent reviews and lease renewals)  
Maintenance management  
Procurement and tendering  
Project audit  
Project financial control and reporting  
Property management  
Strategic real estate consultancy  
Supplier management  
Sustainability  
Works progress and quality management

1 Business Organisation  
2 FM Development and Trends  

Business Management  
Physical asset management  
1 Land  
2 Buildings/Property  
3 Workplace  
4 Information & Communications Technology  
5 Fleet Management  
6 Decommissioning & Disposal  

Services Management  
1 Reception  
2 Post & Messengers  
3 Waste Management  
4 Catering  
5 Cleaning  
6 Laundry  
7 Security  
8 Information & Knowledge  
9 Library & Document Archive  
10 Reprographics, Printing & Stationary  
11 Travel Booking  
12 Stores

Process Management  
1 Human Resources Management  
2 Consultancy  
3 Customer Service  
4 Financial Management  
5 Procurement, Project & Contract Management  
6 Health & Safety Management  
7 Quality Management  
8 Performance Management  
9 Risk Management

Thursday, November 22, 2012
Issues affecting the use and effectiveness of building information for facilities management of historic buildings

• Leading professional body doesn’t have a strong focus on the building fabric
• FM qualification structure doesn’t explicitly refer to historic buildings
• Lack of conservation awareness across other professions involved with FM - e.g. building control, structural engineers
Lack of property data

1989 study showed that:
- 75% of private organisations and
- 68% of public organisations
had a full property inventory

3% of both public and private organisations had **no property inventory** at all.

Lack of Formal Guidance

Facilities Managers look for information from a variety of information Sources:
- Contractors
- Trade literature
- Certification Schemes
- Building Regulations

These sources are not specific to historic buildings and their requirements
Old buildings vs. Modern priorities

- Work to be done on best way to measure the energy performance of older buildings
- Work to be done on identifying and communicating good practice in retrofitting
- Work to be done on assessing the impact of retrofitting and the resulting environmental changes on older materials and finishes

- Information about properties is often not collected in one place.
- Computer-based solutions are frequently home-made and based on the i.t. knowledge of one person
- Poor communication skills - facilities managers may not be good at sharing information
The Building Information Model

Information

Communication

Legal Data
Financial Data
Geospatial Data

Product Data

Environmental Data
Design Data
Maintenance Data
Historic Data
A Building Information Model is:

a digital representation of the physical and
functional characteristics of a facility.

• a knowledge resource for all aspects of a building
• covers the entire building lifecycle
• to be shared across professions
• aggregates data to provide more analysis
• forms a reliable basis for decisions

BIM and Historic Buildings - Current Examples

• Hard to find examples of full BIM implementation for historic buildings
• There is a difference between full BIM and 3d surveys
Chapel at the Royal Sussex County Hospital
Hospital is currently being modernised
All design elements provided in BIM form

Greenhatch Group providing BIM details to the interior of the Chapel
Data to be integrated into the new building scheme and also satisfy listed building consent requirements.
Interior surveyed using a laser scanner and then drawn up in a traditional 2D manner in order to allow plans and internal elevations to be manipulated in a 3D form.
Drawn using the Autodesk Revit Architecture software, which is designed for BIM:

- allows for extracting different views from a building model for drawing production and other uses.
- different views are automatically consistent
- supports mechanical, electrical, and plumbing systems modeling, analysis of systems design
- allows for easier export of design models for cross-discipline collaboration.
Software includes “Cloud” services

- data is stored online and can be accessed from any terminal.
- facilitates sharing.
- includes analysis and rendering capabilities via the cloud
- frees up the users’ terminal while the computing work is done in the cloud.

Learning:

- the requirement to provide all historical and architectural details in BIM required the use of many differing modelling techniques to build up in 3D
- highlights the difficulties of portraying an entire historical building as a BIM product
- cost and time involved to build up accurate historic details in 3D that are dimensionally correct to English Heritage Metric Survey Specifications
- on larger scale, a more simplified structure might be more cost-effective, with specification being dependent on the BIM usages envisaged for the structure
What is the current state of play?

- Government is pushing for BIM to be implemented across the government estate.
- All professional institutes have developed BIM working parties.
- Big firms are increasingly working to BIM standards

English Heritage:

- not as yet done any work on how BIM might be applied across the estate
- attempts to apply it to existing buildings at an early stage
- EH current working on a Asset Management Planning System

Asset Management Planning System

Will consist of:

- Database
  - survey information
  - defect information
- Maintenance Records
- Drawings & Plans
- Records of changes made
Issues EH is dealing with:

- Finding information about buildings
- Getting information from widely distributed sources
- Time and cost - resources are limited
- Storing information in a consistent way
- Ensuring the information is accessible
- Training users
- Security issues
Sir John Betjeman: The Cathedral of Middlesex

English Heritage has documented a tremendous amount of historical information

SOURCES
This section includes the sources, both published and unpublished, for our current knowledge and understanding of Harmondsworth Barn.

Primary Sources (Unpublished)

British Library
- Additional MS 6164 [18th-century copy of extent of Harmondsworth manor, c. 1593–4]

London Metropolitan Archives
- Acc046/ED/001 [agreement concerning lease of Court Lodge and Great Barn, 1617]
- Acc046/ED/002 [lease of Court Lodge, 1617–20]
- Acc046/ED/003 [rental of Harmondsworth, 1642]

The National Archives
- E 31/467-27 [14th-century copy of a charter of King Offa of Mercia to Aeldred, his minister, of 20 hides of land at Harmondsworth in return for 100 mancuses of gold in a bracelet, 781]
- E 31/601 fol 129 [entry concerning Harmondsworth in Domesday survey, 1086]
- SC 6/1126/6 [account of Harmondsworth manor, 1388–9]
- SC 6/1126/7 [account of Harmondsworth manor, 1433–4]
- E 178/1940 [survey and rental of Harmondsworth, 1587]
- D 003/751/2 [account of livestock and stores at Harmondsworth manor, c. 1550–60]
- D 014/752/3–754/77 [summary accounts of estates of the Paget family including Harmondsworth, 1546–60]
- D 003/751/2 [lease of the tithe of Harmondsworth manor including tithe barn, 1726]
Winchester College Muniments (WCM)

- Accounts of Harmondsworth manor: WCM 11501 [1386–7], 11502 [1397–8], 11503 [1406–7], 11504 [1450–51]
- Bursars' accounts: WCM 22078 [1394–5], 22080a [1396–7], 22083 [1397–8], 22084 [1398–9], 22100 [1418–19], 22103 [1424–5], 22104 [1426–7], 22111 [1428–9], 22151 [1484–5]
- WCM 11335 [confirmation charter of Henry II to the Abbot and monks of Holy Trinity and St Katherine, Rouen, 1170–78]
- WCM 11336 [undated copy of confirmation charter of Henry III to the Abbot and monks of Holy Trinity and St Katherine, Rouen]
- WCM 11338 [exemplification of entry from Domesday Book relating to the manor of Harmondsworth, 1341]
- WCM 10744 [extent of Harmondsworth manor, 1378]
- WCM 11346 [copy of petition of William of Wykeham to the Pope for licence to annex to Winchester College the churches of Isleworth, Heston, Twickenham and Hampton, the churches of Hamble, Hound and West Worthingham and the manor of Harmondsworth, c 1391]
- WCM 11354 [copy of authoritative instructions handed by Wykeham to his agents in negotiation with the monastery of St Katherine, Rouen, c 1390–91]
- WCM 11369 [memorandum concerning Wykeham’s intentions in founding his colleges and endowing them with possessions acquired from religious houses, c 1390–91]
- WCM 11355 [letter describing progress of negotiations with the Abbot of St Katherine’s, Rouen, c 1391]
- WCM 11356 [copy of indenture between the Abbot and Convent of St Katherine’s, Rouen, and attorneys of William of Wykeham concerning Harmondsworth, c 1391–2]
- WCM 11376–77 [copy of licence by Richard II to the Abbot and Convent of St Katherine’s, Rouen, to grant to William of Wykeham the manor of Harmondsworth and other estates. 1391]
- WCM 11390 [charter of alienation of manor of Harmondsworth to William of Wykeham, 1391]
- WCM 11382 [acquittance by Abbot of St Katherine’s, Rouen, to Wykeham for 8,600 francs, 1391]
- WCM 11391 [grant of manors of Harmondsworth to William of Wykeham, 1392]
- WCM 11379 [letter of attorney from Wykeham to his agents to receive and deliver all muniments relating to acquisition of Harmondsworth, 1392]
- WCM 11370–1 [petition of Warden and College concerning expenses of works at Winchester College and various estates including Harmondsworth, c 1395–1401]
- WCM 11379 [expenses of works at the College and various estates including Harmondsworth, 1402]
- WCM 12053 [bond of John Downer, carpenter of Harrow Weald, and others (named) to Robert Thurburn, Warden of Winchester College, for 100 marks, 1434]
- WCM 11393 [petition to Henry VI concerning exactions by royal household officials on manor of Harmondsworth, c 1440]
- WCM 11451 [valor (summary) of the manor of Harmondsworth, 1542]
- WCM: uncatalogued letters of T Kirby, Albert Hartshorne and John Harvey in Winchester College Archives concerning Harmondsworth great barn

Primary Sources (Published)

- Bonnin, T (ed), Regestrum Visitationum Archiepiscopi Rothomagensis (Rouen, 1852)
- Kirby, T, ‘Charters of Harmondsworth, Isleworth, Twickenham and Hampton-on-Thames’, Archaeologia, 58:2 (1902), 341–58
- Oschinsky, D (ed), Walter of Hereford and Other Treatises on Estate Management and Accounting (Oxford, 1971)
- Pen and wash drawing of 1792 by Daniel Lysons, showing the barn from the south-west

Visual Sources

- London Metropolitan Archives
  - Pen and wash view of the 15th-century manor house at Harmondsworth, 1794 (Lysons’ Environs of London Collection, vol V, p 138; catalogue no. k1247547)
  - Pen and wash view of the east side of the barn, 1792 (Lysons’ Environs of London Collection, vol V, p 138; catalogue no. k1248027; see above)
  - Photograph of the barn from the south-west, 1974 (London County Council Photograph Library, catalogue no. NAC-PI-01-068-34, 133937)
- Royal Institute of British Architects
  - SKB283/4: Two sketches of interior details by George Gilbert Scott
- English Heritage Archive
  - CC005203–6: Photographs of the barn, 23 May 1950
Secondary Sources (Published)

Antiquarian accounts
Hasted, E, History and Topography of the County of Kent, 12 vols (Canterbury, 1797–1801)
Pommeraye, JF, Histoire de l'Abbaye de La Sainte Trinité-du-Mont de Rouen, in Histoire de l'Abbaye de Saint-Ouen (Rouen, 1662)

Other published books and articles
A detailed, high-quality drawn record of the barn prepared in the 1980s.

Hord, W, The Barns of the Abbey of Beaulieu at its Granges of Great Coxwell and Beaulieu St Leonards (Berkeley and Los Angeles, 1965)
Impy, E, ‘The alien priory of St Winwael and Wimwold House at Wetham, Norfolk’, Norfolk Archaeology, 44 (2004), 420–54
Impy, E and Miles, D, ‘The great barn at Harmondsworth, Middlesex’, English Heritage Historical Review, 7 (2012)
Jenkins, S, John Betjeman’s Heathrow, in The Soiling of Mary Davies and Other Writings (London, 1993), pp 63–70
Jernold, W, Highways and Byways in Middlesex (London, 1869)
Kirk, M, The Barns of West Sussex (London and New York, 1994)
Lyon, D and S, An Historical Account of those Parishes in the County of Middlesex which are not included in the Environs of London (London, 1800), p 139
Mills, J, Harmondsworth, manor farm, in Medieval Britain and Ireland in 1987, ed SM Youngs, J Clark, DRM Gaimster and T Barry, Medieval Archaeology, 32 (1988), 225–304
Morgan, M, ‘The suppression of the alien priories’, History, new series 36 (1941–2), 204–12
Scott, GG, Remarks on Secular and Domestic Architecture, Present and Future (London, 1857)
Thorne, J, Handbook to the Environs of London: alphabetically arranged: containing an account of every town and village, and of all places of interest, within a circle of twenty miles round London (London, 1876)
Watkin, D, The Architecture of Basil Champneys (Cambridge, 1999)
Watkin, D, The Barn from the Medieval Barn: A Nomenclature (Bleakton, 1986)

Secondary Sources (unpublished)
McCurdy, P, Harmondsworth’s Glory, privately printed (1975)
Next week start recording highly detailed 3d data using a laser scanner.

**Conclusions:**

Issues to consider in relation to Digital Information and BIM for managing historic buildings:

- Requirements – the data monster is always hungry!
- Agreed Standards
- Open Source Software – avoiding “lock in”
- Cost
- Security
- Useability
- Training